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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/006,477	11/30/2001	Mark J. Kilgard	NVIDP069/P0000051	3608

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EXAMINER	
QUILLEN, ALLEN E	

ART UNIT	PAPER NUMBER
2676	

DATE MAILED: 08/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/006,477	Applicant(s) KILGARD ET AL.	
	Examiner Allen E. Quillen	Art Unit 2676	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson, U.S. Patent 6,469,704, in view of Deering, Michael F., and Nelson, Scott R., Leo: A System for Cost Effective 3D Shaded Graphics, Proceedings of the 20th Annual Conference on Computer Graphics and Interactive Techniques, ACM Press, NY, NY, September, 1993, pp. 101-108.

5. Regarding claim 1, representative of claims 8, 15-17, 24, Johnson discloses a method for buffering data (Column 15, lines 1-60) in a computer graphics pipeline (Column 8, line 13; Column 25, lines 23-31), comprising: (a) producing graphics floating point data (Column 8. line 5) in a graphics pipeline; (b) operating on the graphics floating point data in the graphics pipeline (Figures 1, 3, Column 7-8) ; and (c) storing the graphics floating point data to a buffer in the graphics pipeline (Figures 5A-5C, 7A-7C, elements 530, 736; Column 15, line 61 through Column 16, line 67).

Johnson does not disclose (d) wherein the graphics floating point data is read and stored in an unclamped format for increasing a parameter selected from the group consisting of a precision and a range of the graphics floating point data. Deering teaches (d) wherein the graphics floating point data is read and stored in an unclamped format for increasing a parameter selected from the group consisting of a precision and a range of the graphics floating point data (*floating point processing*, Page 103, left column, lines 10-14; and fourth paragraph, *format conversion*, line 7-8; *32-bit IEEE floating point, 8-bit, 16-bit, 32-bit or 64-bit*, right column, first paragraph; *compressed from 32-bit...eventually end up as 8-bit values in the frame buffer*, Page 104, left column, third paragraph). The motivation for combining floating point operations with

multiple precision operations is for improved data transfer bandwidth, parallel execution, load balancing of complex mathematical operations involving texturing [shading] operations (Page 102, left column, lines 1-6; right column, lines 2, 4-7; Page 103, left column, second paragraph, lines 1-3; Page 104, right column, third paragraph from the bottom of the page). Deering is evidence that at the time of the invention, it would have been obvious to one skilled in the art of programmable graphical applications using floating point data [OpenGL and Leo] to combine the benefits of buffering data in a pipelined operation, as Johnson discloses, with floating point precision formats, as Deering teaches, to improve data processing in a parallel-pipelined system (Figure 1).

6. Regarding claim 2, representative of claim 9, Johnson discloses a method as recited in claim 1, wherein the graphics floating point data includes fragment data (Figures 2A-2J, Figure 3, *primitives*, Column 7, line 1 through Column 8, line 41).

7. Regarding claim 3, representative of claim 10, Johnson discloses a method as recited in claim 2, wherein the fragment data is received from a rasterizer (*rendering data, coordinate and other primitive data, Front End Subsystem distributor, frame buffer,* Figure 1, element 118, Column 7, lines 34-62, lines 63 through Column 8, line 18).

8. Regarding claim 4, representative of claim 11, Johnson discloses a method as recited in claim 2, wherein the fragment data includes color data (Column 7, lines 25-33, R,G,B, alpha, lines 30-31).

9. Regarding claim 5, representative of claim 12, Johnson discloses a method as recited in claim 2, wherein the fragment data includes depth data (*Z values*, Column 7, line 44).

10. Regarding claim 6, representative of claim 13, Johnson discloses a method as recited in claim 1, wherein the graphics floating point data (see above).

Johnson does not disclose is only constrained by an underlying data type. Deering teaches is only constrained by an underlying data type (*floating point processing*, Page 103, left column, lines 10-14; and fourth paragraph, *format conversion*, line 7-8; *32-bit IEEE floating point, 8-bit, 16-bit, 32-bit or 64-bit,* right column, first paragraph; *compressed from 32-bit...eventually end up as 8-bit values in the frame buffer,* Page 104, left column, third paragraph). The motivation for combining floating point operations with multiple precision operations is for improved data transfer bandwidth, parallel execution, load balancing of complex mathematical operations involving texturing [shading] operations (Page 102, left column, lines 1-6; right column, lines 2, 4-7; Page 103, left column, second paragraph, lines 1-3; Page 104, right column, third paragraph from the bottom of the page). Deering is evidence that at the time of the invention, it would have been obvious to one skilled in the art of programmable graphical applications using floating point data [OpenGL and Leo] to combine the benefits of buffering data in a pipelined operation, as Johnson discloses, with floating point precision formats, as Deering teaches, to improve data processing in a parallel-pipelined system (Figure 1).

11. Regarding claim 7, representative of claims 14, 18, 19, Johnson discloses a method as recited in claim 1, wherein the buffer. Johnson does not disclose the buffer serves as a texture map. Deering teaches disclose the buffer serves as a texture map (RAM chips, Page 102, Figure 2, right column, lines 4-10; left column, second paragraph, lines 2-4; Page 104, left column, third paragraph, lines 1-12; right column fifth paragraph, lines 5-7). The motivation for combining a buffer with a texture map is overcome bandwidth constraints in complex, floating point-intensive graphics display processing(Page 102, left column, lines 1-6; right column, lines 2, 4-7; Page 103, left column, second paragraph, lines 1-3; Page 104, right column, third paragraph from the bottom of the page). Deering is evidence that at the time of the invention, it would have been obvious to one skilled in the art of programmable graphical applications using floating point data to combine the benefits of buffering data in a pipelined operation, as Johnson discloses, with floating point precision formats using the buffer as a texture map, as Deering teaches, to improve data processing in a parallel-pipelined system (Figure 1).

12. Regarding claim 20, Johnson discloses a method of buffering data during multi-pass rendering in a computer graphics pipeline, comprising: (a) operating on graphics floating point data during a rendering pass in a graphics pipeline; (b) reading the graphics floating point data from a buffer during the rendering pass in the graphics pipeline; (c) storing the graphics floating point data to the buffer during the rendering pass in the graphics pipeline; and (d) repeating (a) – (c) during additional rendering passes (Figure 9, *loop, display list mode; redrawn multiple times, vertex accumulator; coalescing,* Column 7, line 22 through Column 8, line 18; Column 11, lines 30-55; Column 13, lines 1-38).

13. Regarding claim 21, Johnson discloses a method as recited in claim 20, wherein the operating includes deferred shading (*DeferredType*, Column 17, lines 1-20).

14. Regarding claim 22, representative of claim 23, Johnson discloses a method for buffering data in a computer graphics pipeline, comprising: (a) producing graphics floating point data in a graphics pipeline; (b) packing/unpacking graphics floating point data in a graphics pipeline; (c) storing/operating on the unpacked graphics floating point data to a buffer in the graphics pipeline (see above *States, pixel-packing conventions,* Column 11, lines 16-22).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen E. Quillen whose telephone number is (703) 605-4584. The examiner can normally be reached on Tuesday – Friday, 8:30am – noon and 1:00 - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew C. Bella, can be reached on (703) 308-6829.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

Or FAX'd to:

(703) 872-9314 (for Technology Center 2600 only)

Hand delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Sixth Floor (Receptionist), Arlington, Virginia

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number (703) 305-9600 or (703) 305-3800.

Allen E. Quillen
Patent Examiner
Art Unit 2676

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August 19, 2003

MATTHEW C. BELLA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600